

AKAI SERVICE MANUAL



PROGRAMMABLE MATRIX SYNTHESIZER

MODEL VX600

CAUTION: Before servicing, to protect customer's program data from being damaged, save all data to IC memory card.

SPECIFICATIONS

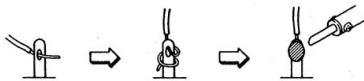
Model	Programmable matrix analog synthesizer	POWER SWITCH
Key board	37-key C-C scale (with dynamics velocity and key pressure functions)	MEMORY PROTECT
Simultaneous sounds	6 voices	SWITCH
Sound source	12 VCO/2 VCO group	CONTRAST
Display	40 characters x 8 lines, liquid crystal graphic display	Connection terminals
Internal memory	Battery back up type	INSTRUMENT
Packet	10×20 programs	EW11000/EV1100
Library	50 tones	Standard phone jack ×2
Program	40 programs	Standard phone jack
Chord	20 patterns	Standard stereo phone jack (monaural)
External memory	Compatible with IC memory card (AKAI BR-16/16K bytes)	DIN/13 pin
Packet	10×20 programs ×2	VOICE OUT
Library	50 tones ×2	PROGRAM
Program	40 programs ×2	UP/DOWN
Chord	20 patterns ×2	PEDAL 1
Function	BEND ADJUST/WIDTH GLIDE ADJUST/TIME BREATH ADJUST/SENSE VIBRATE VOLUME CONTROL KNOB CURSOR KEY(△▽◀▶) TEN KEY MENU KEY ENTER KEY SOFT KEY	PEDAL 2
		MIDI IN/OUT/THRU
		I/O PORT
		Power requirement
		AC 100V, 50/60Hz for japan
		AC 120V, 60Hz for USA and canada
		AC 220V, 50Hz for europe except UK
		AC 240V, 50Hz for UK and australia
		Power consumption
		21 W
		External dimensions
		602(W)×116(H)×305(D) mm
		Weight
		8.2 kg

* For improvement purposes, specifications and design are subject to change without notice.

★SAFETY INSTRUCTIONS

PRECAUTIONS DURING SERVICING

1. Parts identified by the  symbol parts are critical for safety. Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers (Insulating Barriers)
 - 4) Insulation sheets for transistors
 - 5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SAFETY CHECK AFTER SERVICING

After servicing, make measurements of leakage-current or resistance in order to determine that exposed parts are acceptably insulated from the supply circuit.

The leakage-current measurement should be done between accessible metal parts (such as chassis, ground terminal, microphone jacks, signal-input/output connectors, etc.) and the earth ground through a resistor of 1500 ohms paralleled with a 0.15 μ F capacitor, under the unit's normal working conditions. The leakage-current should be less than 0.5 mA rms AC.

The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch (if included) "ON". The resistance should be more than 2.2 Mohms.

PRECAUTIONS FOR LITHIUM BATTERY

The lithium battery may explode when heated excessively. [OBSERVE THE FOLLOWING WHEN REPLACING]

- Replace with the same make and type only.
- Use soldering iron in "recommended way" only.
- Place battery in correct polarity.
- Do not short the terminals.
- Do not recharge battery.
- Do not dispose of battery in fire.



[DANGER]



[RECOMMENDED WAY]

★INFORMATION

SYMBOLS FOR PRIMARY DESTINATION

Alphabet indicates the destination of the units as listed below.

Symbols	Principal Destinations
[A]	USA
[B]	UK
[C]	Canada
[E]	Europe (except UK)
[J]	Japan
[S]	Australia
[V]	W. Germany only
[U]	Universal Area
[Y*]	Custom version

VOLTAGE CONVERSION

(E.V.B.S Model only)

Before connecting the power cord. Set the VOLTAGE SELECTOR located on the bottom plate with a screwdriver so that the correct voltage is indicated.



I. CONTROL

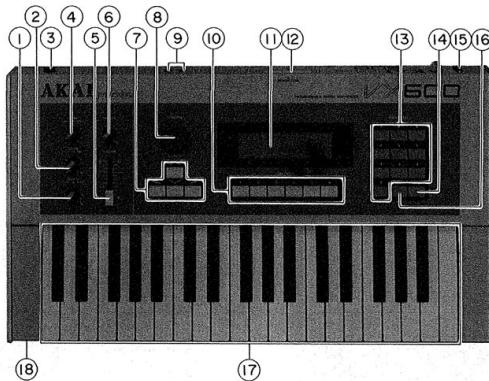


Fig. 1-1 View from the top

① BREATHE ADJUST/SENSE control

This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the breath sensor and a knob(SENSE) to set the operation point appropriate for the players breath pressure.

② GLIDE ADJUST/TIME control

This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the glide controllers, and a knob(TIME) to adjust the glide time.

③ INSTRUMENT connector

This terminal is used to connect the EWI1000 or EVI1000 unit when playing the AKAI electric wind/valve instrument. Use the connection cable included with the EWI1000 or EVI1000, or the AKAI EWX70(for the EWI1000) or the AKAI EV-X70(for the EVI1000) extension cable.

④ BEND ADJUST/WIDTH control

This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the bend controllers, and a knob(WIDTH) to adjust the bend width.

⑤ VOLUME control

This is used to adjust the output level of the VX600.

⑥ VIBRATE control

This knob is used to adjust vibrate and tremolo when using the AKAI electric wind/valve instrument.

⑦ CURSOR key

These keys are used to increase or decrease the "octave shift" and to move the "cursor".

⑧ CONTROL knob

This knob is used to set the "VALUE" of the various parameters, and scroll the "MENU". It is also used to "input characters" for tone names, library names, packet names, etc..

⑨ EXT IN

When playing with the external source such as a digital sampler, etc.. This external input terminal can be used to process the tone and volume of the external source with the VX600.

⑩ SOFT keys

These are "soft keys" which have different functions according to the screen which is displayed.

⑪ DISPLAY

This display is used to show the program menu, and various program editing screens.

⑫ MEMORY CARD port

This is the port for the "memory card". Use the AKAI "BR-16" memory cards.

⑬ TEN key

These keys are used to set the "VALUE" of the various parameters, input "LIBRARY NUMBERS" and "PACKET NUMBERS".

⑭ ENTER key

This key is used to call the mode specified by the cursor, and register items.

⑮ POWER switch

This switch used to turn the power ON and OFF.

⑯ MENU key

This is used to call the "MENU WINDOW".

⑰ KEY BOARD

This is a 37 key keyboard(C-C scale) which has dynamic velocity and key pressure functions.

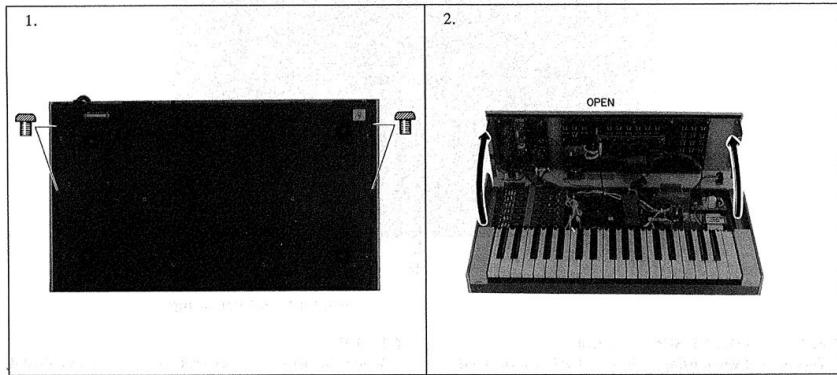
⑲ PHONES jack

A headphone set can be used to monitor. The volume output to the headphone is adjusted with "VOLUME" control.

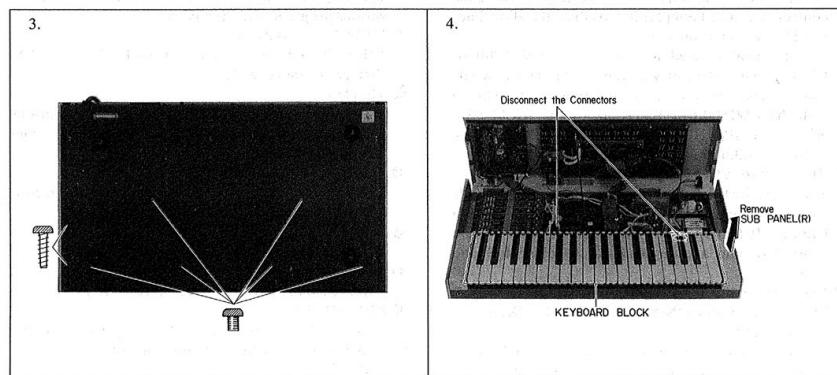
II. DISASSEMBLY

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in the reverse order.

1-1. HOW TO OPEN THE TOP(CONTROL) PANEL.



1-2. HOW TO DISMANTLE THE KEYBOARD BLOCK.



III. PRINCIPAL PARTS LOCATION

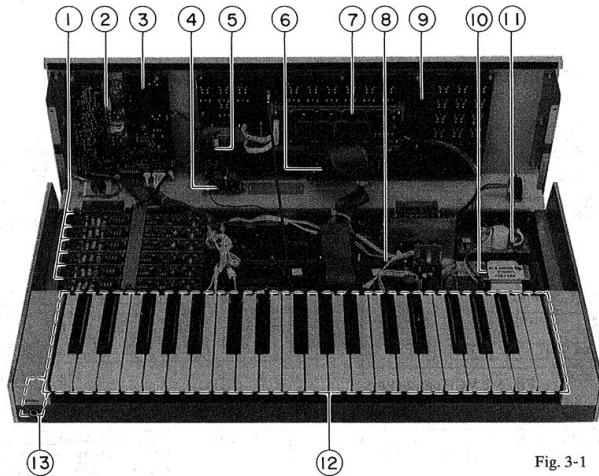


Fig. 3-1

- ① VOICE PCBs
- ② VR PCB
- ③ OPERATION (B) PCB
- ④ EXT IN JACK PCB
- ⑤ ENCODER PCB
- ⑥ MEMORY CARD PCB
- ⑦ LCD BLOCK

- ⑧ CPU PCB
- ⑨ OPERATION (A) PCB
- ⑩ POWER TRANSFORMER
- ⑪ FILTER PCB
- ⑫ KEYBOARD BLOCK
- ⑬ HEADPHONE PCB

IV. ELECTRICAL ADJUSTMENT

4-1. BEFOR ADJUSTMENT

When adjusting the model VX600, each adjustment requires a particular setting of parameters and modulation matrix. Before adjustment, edit the library which used for the adjustment according to the following procedure and save them to the memory card.

[L01: For VIBRATE OFF-SET adjustment]

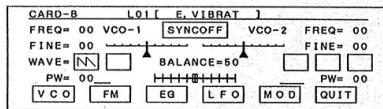


Fig. 4-1 VCO parameters

CARD-B		L01 [E, VIBRAT]									
		DLY	ATK	DCY1	DCY2	SUS	RES	DEP	VEL		
<EG01>	00	60	60	60	60	60	40	99	00		
<EG02>	00	20	30	30	30	60	40	99	00		

Fig. 4-4 EG parameters

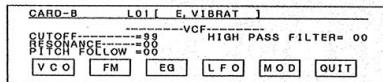


Fig. 4-2 VCF parameters

CARD-B		L01 [E, VIBRAT]									
		WAVE	SPEED	DELAY	DEPTH						
<LFO1>		00	00	00	00						

Fig. 4-5 LFO parameters

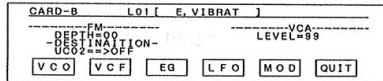


Fig. 4-3 FM/VCA parameters

CARD-B		L01 [E, VIBRAT]									
--MOD--		--SOURCE--		--DEPTH--		--DESTINATION--					
01:	[KEY GATE]	+99		[VCA AMP]		00		[VCO1, 2 FREQ]			
02:	[KEY GATE]	+99		00		[VCO1, 2 FREQ]					

Fig. 4-6 MOD. matrix

[L02: For AFTER TOUCH adjustment]

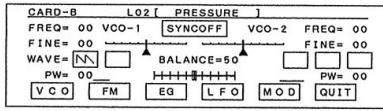


Fig. 4-7 VCO parameters

CARD-B		L02 [PRESSURE]									
		DLY	ATK	DCY1	DCY2	SUS	RES	DEP	VEL		
<EG01>	00	60	60	60	60	60	40	99	00		
<EG02>	00	20	30	30	30	60	40	99	00		

Fig. 4-10 EG parameters

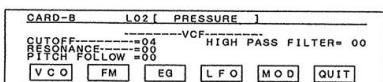


Fig. 4-8 VCF parameters

CARD-B		L02 [PRESSURE]									
		WAVE	SPEED	DELAY	DEPTH						
<LFO1>		00	20	00	00						

Fig. 4-11 LFO parameters

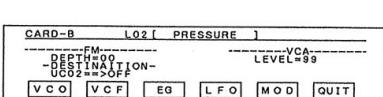


Fig. 4-9 FM/VCA parameters

CARD-B		L02 [PRESSURE]									
--MOD--		--SOURCE--		--DEPTH--		--DESTINATION--					
01:	[KEY GATE]	+99		[VCA AMP]		00		[CUTOFF]			
02:	[KEY GATE]	+99		00		[CUTOFF]					

Fig. 4-12 MOD. matrix

[L03: For DAC OUTPUT LEVEL adjustment]

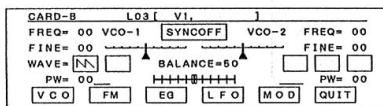


Fig. 4-13 VCO parameters

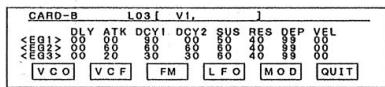


Fig. 4-16 EG parameters

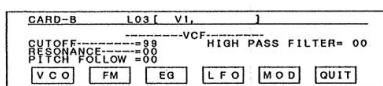


Fig. 4-14 VCF parameters

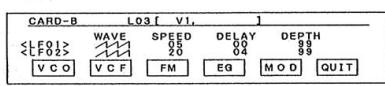


Fig. 4-17 LFO parameters

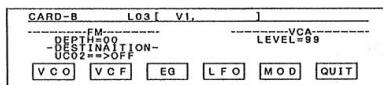


Fig. 4-15 FM/VCA parameters

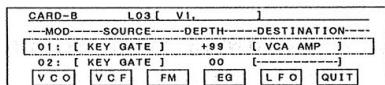


Fig. 4-18 MOD. matrix

[L04: For NOISE OUTPUT LEVEL adjustment]

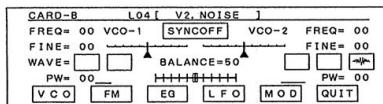


Fig. 4-19 VCO parameters

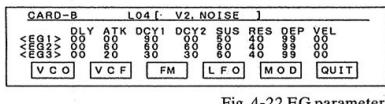


Fig. 4-22 EG parameters

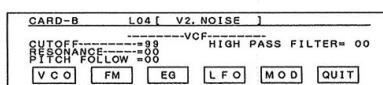


Fig. 4-20 VCF parameters

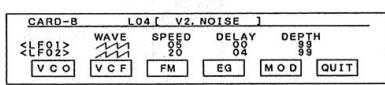


Fig. 4-23 LFO parameters

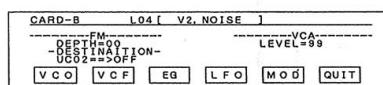


Fig. 4-21 FM/VCA parameters

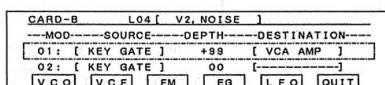


Fig. 4-24 MOD. matrix

4-2. INSTRUMENT CONNECTION

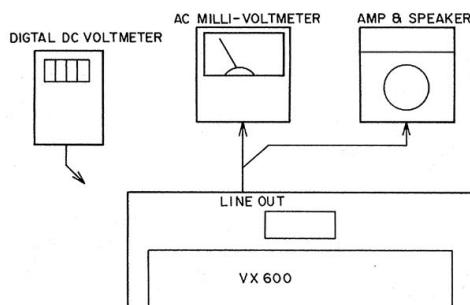
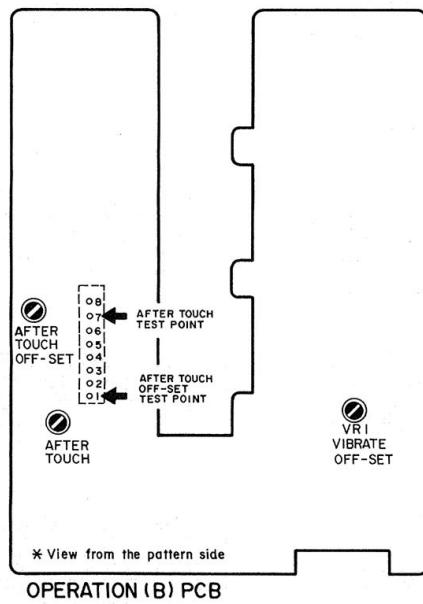


Fig. 4-25 Instrument connection

4-3. ADJUSTMENT OF THE OPERATION (B) PC BOARD.



OPERATION (B) PCB

Fig. 4-26 Adjustment points of the OPERATION (B) PCB.

4-3-1. VIBRATE OFF-SET adjustment

- 1) Set the memory card which made in the step 4-1. BEFOR ADJUSTMENT, and select library to "L01 [E, VIBRATE]".
- 2) While pressing the "C5" key, turn the VIBRATE control knob fully clockwise and counter clockwise.
- 3) If the tone is changed, when the VIBRATE control knob is turning fully clockwise and counter clockwise, adjust VR1(VIBRATE OFF-SET) so that the tone is not changed.

4-3-2. AFTER TOUCH adjustment

- 1) Select the library to "L02 [PRESSURE]" and connect a digital DC voltmeter between pin ① of the IC1(M5218L) and GND.
- 2) Adjust VR3(AFTER TOUCH OFF-SET) so that the reading on the digital DC voltmeter is 0 V.
- 3) Connect a DC voltmeter between pin ⑦ of the IC1(M5218L) and GND. At this time confirm that the reading voltage is more than 4.8 V.
- 4) While pressing the lightest key by about 200g pressure, adjust VR2(AFTER TOUCH) so that the reading voltage is decreased to nearly 0 V.

4-4. ADJUSTMENT OF THE CPU PC BOARD

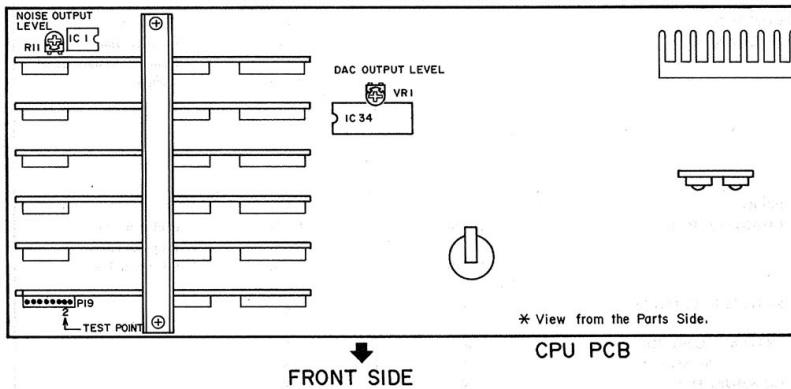


Fig. 4-27 Adjustment points of the CPU PCB

4-4-1. DAC OUTPUT LEVEL adjustment

- 1) Select the library to "L03 [V1,]" and connect a digital DC voltmeter between pin ② of the connector P19 and GND (refer to Fig. 4-27).
- 2) Adjust VR1(DAC OUTPUT LEVEL) so that the reading on the digital DC voltmeter is 2.5 V.

4-4-2. NOISE OUTPUT LEVEL adjustment

- 1) Select the library to "L04 [V2, NOISE]", and connect an AC milli-voltmeter to LINE OUT.
- 2) While pressing the any key, adjust R11(NOISE OUTPUT LEVEL) so that the reading on the AC milli-voltmeter is -8 dBm.

[NOTE]: Adjustment volume R11(NOISE OUTPUT LEVEL) is not included on some models.

V. MIDI IMPLEMENTATION CHART

[PROGRAMMABLE MATRIX SYNTHESIZER]

Model VX600

MIDI Implementation Chart Version : 1.00

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
BASIC CHANNEL DEFAULT CHANGED	1 - 16 1 - 16	1 - 16 1 - 16	Memorized
DEFAULT MODE MESSAGES ALTERED	Mode 3	× × ×	
NOTE NUMBER : True voice	24 - 108	24 - 108	Octave shift
VELOCITY NOTE ON NOTE OFF	9nH V=1 - 127 9nH V=0 ,8nH	○ ○	
After Touch KEY'S CH'S	×	×	
PINCH BENDER	○	○	
CONTROL CHANGE 4 7 64	○ ○ ○	○ ○ ○ 00 - 31	Foot pedal Main volume Damper, Sustain pedal Assignable
PROG CHANGE : TRUE #	1 - 20 1 - 40 1 - 50	1 - 20 1 - 40 1 - 50	Packet mode Program mode Library mode
SYSTEM EXCLUSIVE	×	×	
SYSTEM : SONG POS SONG SEL COMMON: TUNE	×	×	
SYSTEM : CLOCK REAL TIME : COMMANDS	×	×	
AUX : LOCAL ON/OFF ALL NOTES OFF MES- : ACTIVE SENSE SAGES : RESTE	×	×	
Notes			

MODE 1 : OMNI ON, POLY
MON 3 : OMNI OFF, POLY

MODE 2 : MONI ON, MONO
MODE 4 : 4MONI OFF, MONO

○=YES
×=NO

— SERVICE MANUAL —

VI. PARTS LIST

ATTENTION

1. When placing an order for parts, be sure to list Part No., Model No. and the description of each part. Otherwise, the non-delivery of the part or the delivery of a wrong part may result.
2. Please make sure that Part No. is correct when ordering. If not, a part different from the one you ordered may be delivered.
3. Since the parts shown in Parts List of Preliminary Service Manual may have been the subject of changes, please use this Parts List for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List lists those parts which are considered necessary for repairs. Other common parts, such as resistors and capacitors, are listed in the "Common List for Service Parts" from which these parts should be selected and stocked.
2. The Recommended Spare Parts List shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
4. How to read the Parts List.

a) Mechanism Block

2. HEAD BASE BLOCK

REF. NO.	PART NO.	DESCRIPTION
1	BH-T2023A320A	HEAD BASE BLOCK
2	HP-H2206A010A	HEAD R/P PR4-8FU C
3	ZS-477876	PAN20X03STL CMT
4	ZS-536488	BID20X08STL CMT
5	ZG-402895	SP CS ANGLE ADJUST

SP (Service Parts) Classification

This number corresponds with the individual parts index number in that figure.

b) PC Board

6. MAIN PC BOARD

REF. NO.	PART NO.	DESCRIPTION
IC1	EI-324536	IC HD14049BP
IC2	EI-336801	IC MB8841-564M
C1A	EC-338399	C MMY V 223M 250AC [U,E,B,S]
C1B	EC-350949	C MMY V 223M 250DC [J]
C1C	EC-338397	C MMY V 223M 125AC [C,A]
X1	EI-318384	OSC X'TAL NC-18C

Symbols for primary destination
[A] : AAL (U.S.A) [S] : SAA (Australia)
[B] : BEAB (England) [U] : U/T (Universal
[C] : CSA (Canada) Area)
[E] : CEE (Europe) [V] : VDE (W. Germany)
[J] : JPN (Japan) [Y] : Custom Version

SP (Service Parts) Classification

These reference symbols correspond with component symbols in the Schematic Diagrams.

The available PC Board Blocks are listed separately.

5. When Part No. is known, Parts Index at end of Parts List can be used to locate where that part is shown in Parts List by its Reference No. listed at right of Part No.

WARNING

Δ(*) INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS.

AVERTISSEMENT

Δ(*) IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

1. RECOMMENDED SPARE PARTS

We suggest you to stock the following Recommended Spare Part items listed below since they can cover most of the routine service.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	*BT-383927J	TRANS POW L1023 C,A [C,A,Y1]	58	EI-356049	IC TC74HC139P
2	*BT-383928J	TRANS POW L1023 E,V,B,S [E,V,B,S]	59	EI-375220	IC TC74HC154P
3	*BT-383926J	TRANS POW L1023 J [J]	60	EI-360053	IC TC74HC175P
4	*BT-383935J	TRANS PULSE 2E16-1001-01	61	EI-360029	IC TC74HC244P
5	ED-376335	D SCHOTTKY SB02-03 T05	62	EI-360032J	IC TC74HC245AP
6	*ED-357036	D SILICON DBA208-K15 100/ 2.0A	63	EI-360047	IC TC74HC374P
7	*ED-357038	D SILICON DBB108 100/ 1.0A	64	EI-370487	IC TC74HC42P
8	ED-301911	D SILICON H D5448	65	EI-360028	IC TC74HC74P
9	ED-344280	D SILICON H GMA-01-FY2 F05	66	EI-371671	IC UPD781C1G-044-36
10	ED-346536	D ZENER H HZ7C3L	67	EI-380930J	IC UPD7831G-36
11	*EF-355385	FUSE BET T 250V 315MA [B]	68	EI-354146	IC UPD8253C-2
12	*EF-355374	FUSE BET T 250V 500MA [B]	69	EI-364257	OSC XTAL NR-18
13	*EF-358974	FUSE BET T 250V 630MA [B]	70	EM-382317J	IND LCD EDMIG245633B
14	*EF-695766	FUSE SEMKO T 250V 315MA [E,V,S]	71	*EO-360068	COIL LF L-2 B
15	*EF-593706	FUSE SEMKO T 250V 500MA [E,V,S]	72	*ER-200972	R FUSE H S10 ERD2FC 1/4W 33R0G
16	*EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]	73	*ER-360725	R OMP H S11 FS 1W 221J
17	*EF-306124	FUSE TSC A 250V 630MA [J]	74	ES-380946J	ROTARY ENCODER EC16B25D
18	*EF-309388	FUSE TSC A 250V 800MA [J]	75	ES-364255	SW SLIDE SSP322
19	*EF-305703	FUSE TSC 125V 630MA [C,A,Y1]	76	ES-349474	[MEMORY PROTECT SW]
20	*EF-309391	FUSE TSC 125V 800MA [C,A,Y1]	77	ES-306430	SW TACT SKHHAM004A
21	EH-370520	COMP C EXF-P81022W	78	ET-354167	VOLTAGE SELECTOR SW
22	EH-351973	COMP R RKC1/BB4 472J	79	*ET-375446	DETECTOR PC900V
23	EH-353789	COMP R RKC1/BB6 103J	80	ET-349883	TR 2S81142
24	EH-359185	COMP R RKC1/BB8 103J	81	ET-360137	TR 2SC3390 U,V F05
25	EH-379505	FILTER EMI EXC-EMT102BC	82	ET-349592	TR 2SC3400 F05
26	*EI-380920J	IC AN6531	83	EV-385801J	[BEND]
27	*EI-380921J	IC AN6535	84	EV-365885	VR ROTARY V012LP B202 L=20
28	*EI-380919J	IC AN79112	85	EV-365876	[CONTRAST VR]
29	EI-380918J	IC CEM3374	86	EZ-058816	VR SLIDE VJ4513-2PVNB5 103
30	EI-385445J	IC CEM3378			[VOLUME]
31	EI-369660	IC CXK5816PN-12L			BATTERY LITHIUM BR2032H-1HF
32	EI-375437	IC LC3664NL-10			
33	EI-376276	IC LC7981			
34	EI-375347	IC MM74HC14N			
35	EI-375245	IC MM74HC973N			
36	EI-375439	IC MC206P			
37	EI-359227	IC M6216L			
38	EI-346071	IC M5218L-21			
39	EI-347919	IC M5218P			
40	*EI-359552	IC M5236L			
41	EI-362588	IC M5238P			
42	EI-364275	IC M74LS05P			
43	EI-364247	IC NM113600			
44	EI-385444J	IC NMC27C256Q200			
45	EI-389670J5	[BLANK ROM]			
46	EI-380948J	IC NMC27C56Q200			
47	EI-388249J2	[BLANK ROM]			
48	EI-378297	IC NMC27C64Q200			
49	EI-364253	IC PCM54HP			
50	EI-376178	IC PST520D-2			
51	EI-302233	IC SSM2300			
52	EI-200573	IC TC4051BP			
53	EI-310036	IC TC4053BP			
54	EI-360040	IC TC4066BP			
55	EI-360037J1	IC TC74HC004AP			
56	EI-360026J1	IC TC74HC004AP			
57	EI-375222	IC TC74HC125P			

2. P.C BOARD BLOCK

Ref. No.	Part No.	Description
1	BA-L1023A020A	PC CPU BLK VX600
2	BA-L1023A030A	PC VOICE BLK VX600
3	BA-L1023A040A	PC (#) OPERATION BLK VX600

PC (#) OPERATION BLK CONSISTS OF FOLLOWING P.C BOARD.

- * OPERATION (A) P.C BOARD
- * OPERATION (B) P.C BOARD
- * VR P.C BOARD
- * OPERATION (D) P.C BOARD
- * HEADPHONE P.C BOARD
- * ENCODER P.C BOARD
- * OPERATION (G) P.C BOARD

PARTS LIST

3. CPU P.C BOARD

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
BT1	EZ-358816	BATTERY LITHIUM BR032-1HF	IC39	EI-360029	IC TC74HC244P
C122	EC-369716	C EC V CUT SR-AKY 102M 25.00C	IC40	EI-302233	IC TC4051BP
C123	EC-369716	C EC V CUT SR-AKY 102M 25.00C	IC41	EI-375345	IC MM74HC373N
C126	EC-369719	C EC V CUT SR-TIK 472M 16.00C	IC42	EI-375345	IC MM74HC373N
CR1	EH-370520	COMP C EXP-P81022W	IC43	EI-360053	IC TC74HC175P
CR2	EH-359185	COMP R RKC1/888 103J	IC44	EI-380939J	IC UPD78310G-36
CR3	EH-353789	COMP R RKC1/888 103J	IC45	EI-389670J5	IC NM74C256Q200 VX600-1-V1.15 [PROGRAMMED ROM]
CR4	EH-351973	COMP R RKC1/884 472J	*IC45	EI-385444J	IC NM74C256Q200 [BLANK ROM]
D1	*ED-357038	D SILICON DBB108 100V 1.0A	IC46	EI-371671	IC UPD78C11G-04-36
D2	*ED-357036	D SILICON DBA20B-K15 100V 2.0A	IC47	EI-388249J2	IC NM74C640200 VX600-2-V1.12 [PROGRAMMED ROM]
D4	ED-344280	D SILICON H GMA-01-FY2 F05	*IC47	EI-380948J	IC NM74C640200 [BLANK ROM]
D5	ED-344280	D SILICON H GMA-01-FY2 F05	IC48	EI-360026J1	IC TC74HC04AP
D6	ED-344280	D SILICON H GMA-01-FY2 F05	IC49	EI-356049	IC TC74HC139P
D7	ED-344280	D SILICON H GMA-01-FY2 F05	IC50	EI-360028	IC TC74HC74P
D8	ED-344280	D SILICON H GMA-01-FY2 F05	IC51	EI-375347	IC LC8664NL-10
D9	ED-344280	D SILICON H GMA-01-FY2 F05	IC52	EI-370487	IC TC74HC42P
D10	ED-344280	D SILICON H GMA-01-FY2 F05	IC53	EI-370487	IC TC74HC42P
D11	ED-344280	D SILICON H GMA-01-FY2 F05	IC54	EI-360040	IC TC74HC40UP
D12	ED-346536	D ZENER H HZ7C3L	IC55	EI-360047	IC TC74HC474P
D13	ED-301911	D SILICON H DS448	IC56	EI-360037J1	IC TC74HC040P
D14	ED-344280	D SILICON H GMA-01-FY2 F05	IC57	EI-375437	IC LC8664NL-10
D15	ED-301911	D SILICON H DS448	IC58	EI-369860	IC CX8616PN-12L
D16	ED-344280	D SILICON H GMA-01-FY2 F05	IC59	EI-375220	IC TC74HC154P
D17	ED-344280	D SILICON H GMA-01-FY2 F05	IC60	EI-375220	IC TC74HC154P
D18	ED-344280	D SILICON H GMA-01-FY2 F05	IC61	EI-354146	IC UPD8253C-2
D20	ED-344280	D SILICON H GMA-01-FY2 F05	IC62	EI-375347	IC WM74HC14N
D21	ED-301911	D SILICON H DS448	IC63	EI-378276	IC LC7981
FL1	EH-379500	FILTER EMI EXC-EMT102BC	IC64	*EI-359552	IC M5236
FL2	EH-379500	FILTER EMI EXC-EMT102BC	IC65	*EI-380920J	IC AN6531
FL3	EH-379500	FILTER EMI EXC-EMT102BC	IC66	*EI-380921J	IC AN6535
FL4	EH-379500	FILTER EMI EXC-EMT102BC	IC67	*EI-380920J	IC AN6531
FL5	EH-379500	FILTER EMI EXC-EMT102BC	IC68	*EI-380921J	IC AN6535
FL6	EH-379500	FILTER EMI EXC-EMT102BC	IC69	EI-364253	IC PST520D-2
FL7	EH-379500	FILTER EMI EXC-EMT102BC	IC70	*EI-380919J	IC AN791L2
FL8	EH-379500	FILTER EMI EXC-EMT102BC	IC71	EI-346071	IC M5218L-21
FL9	EH-379500	FILTER EMI EXC-EMT102BC	J1	EJ-360771	DIN J TC55037-01-241 13P [VOICE OUT]
FL10	EH-379500	FILTER EMI EXC-EMT102BC	J2	EJ-354105	PHONE J 2P HLJ0520-110 6.3 [LINE OUT]
FL11	EH-379500	FILTER EMI EXC-EMT102BC	J3	EJ-379523	PHONE J 3P HLJ4305-3080 S.NUT [PROTECT SW]
IC1	EI-349719	IC M5218P	J4	EJ-354105	PHONE J 2P HLJ0520-110 6.3 [UP/DOWN]
IC2	EI-349719	IC M5218P	J5	EJ-379523	PHONE J 3P HLJ4305-3080 S.NUT [PRG]
IC3	EI-310036	IC TC4066BP	J6	EJ-364256	DIN J M1704 3P [MIDI]
IC4	EI-353227	IC M5216L	L1	EO-316385	COIL FIX 1 LAL04 102K
IC5	EI-362588	IC M5238P	L2	EO-316385	COIL FIX 1 LAL04 102K
IC6	EI-364247	IC NJM13600	PH1	ET-354167	DETECTOR PC900V
IC7	EI-362588	IC M5238P	P28	EJ-365834	PLUG RK-H341TD-0190 34P
IC8	EI-360047	IC TC74HC374P	P29	EJ-365891	OLUG RA-261TD-0190 26P
IC9	EI-360047	IC TC74HC374P	R29	ER-306805	R CB H S15 FS RDS 1/2W 101J
IC10	EI-376178	IC SSM2300	R30	ER-306805	R CB H S15 FS RDS 1/2W 101J
IC11	EI-376178	IC SSM2300	R152	*ER-360725	R OMF H S12 FS 1W 221J
IC12	EI-376178	IC SSM2300	R165	*ER-200972	R FUSE H S10 ERDFC 1/4W 33R0G
IC13	EI-376178	IC SSM2300	RL1	EQ-349829	RELAY SIS G5A-237P 2TR 12V
IC14	EI-376178	IC SSM2300	SW1	ES-364255	SW SLIDE SSP322
IC15	EI-362588	IC M5238P	T1	*BT-383935J	[MEMORY PROTECT SW] TRANS PULSE 2E16-1001-01
IC16	EI-364247	IC NJM13600	TR1	ET-360137	TR 2SC330 U,V,F05
IC17	EI-362588	IC M5238P	TR2	ET-360137	TR 2SC330 U,V,F05
IC22	EI-360047	IC TC74HC374P	TR3	ET-349883	TR 2SC243 D,E
IC28	EI-360047	IC TC74HC374P	TR4	*ET-375446	TR 2SB1142
IC29	EI-349719	IC M5218P	TR5	ET-360137	TR 2SC330 U,V,F05
IC31	EI-360053	IC TC74HC175P	TR6	ET-360137	TR 2SC330 U,V,F05
IC32	EI-364247	IC M74LS05P	TR7	ET-349592	TR 2SC340 F05
IC33	EI-360037J1	IC TC74HC040P	TR8	ET-349592	TR 2SC340 F05
IC34	EI-378297	IC PCM54P	TR9	ET-349592	TR 2SC340 F05
IC35	EI-360047	IC TC74HC374P	TR10	ET-349592	TR 2SC340 F05
IC36	EI-360032J1	IC TC74HC245AP	TR11	ET-349592	TR 2SC340 F05
IC37	EI-375222	IC TC74HC125P	TR12	ET-349592	TR 2SC340 F05
IC38	EI-380029	IC TC74HC244P			

PARTS LIST

5. OPERATION (A) P.C BOARD

Ref. No.	Part No.	Description
VR1	EV-365865	VR ROTARY V012LPH B202 L=20 [CONTRAST VR]
VR2	EV-390045J	R S-FIX H RH0421C 0.20W 332
VR3	EV-390046J	R S-FIX H RH0421C 0.20W 224
X1	E1-364257	OSC XTAL NR-18
W201	EW-380934J	WIRE ASSY VX600 W201 26P
1	EZ-200473	SILICON RUBBER SHEET TC-30
F2	*EF-305124	FUSE TSC A 250V 630MA [J]
F3	*EF-309388	FUSE TSC A 250V 800MA [J]
F4	*EF-309388	FUSE TSC A 250V 800MA [J]
F2A	*EF-305703	FUSE TSC 125V 630MA [C,A,Y1]
F3A	*EF-309391	FUSE TSC 125V 800MA [C,A,Y1]
F4A	*EF-309391	FUSE TSC 125V 800MA [C,A,Y1]
F2B	*EF-593706	FUSE SEMKO T 250V 500MA [E,V,S]
F3B	*EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]
F4B	*EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]
F2C	*EF-355374	FUSE BET T 250V 500MA [B]
F3C	*EF-358974	FUSE BET T 250V 630MA [B]
F4C	*EF-358974	FUSE BET T 250V 630MA [B]

4. VOICE P.C BOARD

Ref. No.	Part No.	Description
C25	EC-306445	C MC V FM 221J 500DC
C26	EC-427948	C MC V FM 100J 500DC
C29	EC-306445	C MC V FM 221J 500DC
C31	EC-306445	C MC V FM 221J 500DC
D2	ED-344280	D SILICON H GMA-01-FY2 F05
D3	ED-344280	D SILICON H GMA-01-FY2 F05
D4	ED-344280	D SILICON H GMA-01-FY2 F05
D5	ED-344280	D SILICON H GMA-01-FY2 F05
IC1	E1-380918J	IC CEM3374
IC2	E1-349719	IC M5218P
IC3	E1-310036	IC TC4066BP
IC4	E1-200573	IC TC4053BP
IC5	E1-385445J	IC CEM3378
IC6	E1-349719	IC M5218P
IC7	E1-375439	IC M5206P
IC8	E1-349719	IC M5218P

Ref. No.	Part No.	Description
D1	ED-301911	D SILICON H D5448
D2	ED-301911	D SILICON H D5448
D3	ED-301911	D SILICON H D5448
D4	ED-301911	D SILICON H D5448
D5	ED-301911	D SILICON H D5448
D6	ED-301911	D SILICON H D5448
D7	ED-301911	D SILICON H D5448
D8	ED-301911	D SILICON H D5448
D9	ED-301911	D SILICON H D5448
D10	ED-301911	D SILICON H D5448
D11	ED-301911	D SILICON H D5448
D12	ED-301911	D SILICON H D5448
D13	ED-301911	D SILICON H D5448
D14	ED-301911	D SILICON H D5448
D15	ED-301911	D SILICON H D5448
D16	ED-301911	D SILICON H D5448
D17	ED-301911	D SILICON H D5448
D18	ED-301911	D SILICON H D5448
D19	ED-301911	D SILICON H D5448
D20	ED-301911	D SILICON H D5448
D21	ED-301911	D SILICON H D5448
D22	ED-301911	D SILICON H D5448
SW1	ES-349474	SW TACT SKH4M004A
SW2	ES-349474	SW TACT SKH4M004A
SW3	ES-349474	SW TACT SKH4M004A
SW4	ES-349474	SW TACT SKH4M004A
SW5	ES-349474	SW TACT SKH4M004A
SW6	ES-349474	SW TACT SKH4M004A
SW7	ES-349474	SW TACT SKH4M004A
SW8	ES-349474	SW TACT SKH4M004A
SW9	ES-349474	SW TACT SKH4M004A
SW10	ES-349474	SW TACT SKH4M004A
SW11	ES-349474	SW TACT SKH4M004A
SW12	ES-349474	SW TACT SKH4M004A
SW13	ES-349474	SW TACT SKH4M004A
SW14	ES-349474	SW TACT SKH4M004A
SW15	ES-349474	SW TACT SKH4M004A
SW16	ES-349474	SW TACT SKH4M004A
SW17	ES-349474	SW TACT SKH4M004A
SW18	ES-349474	SW TACT SKH4M004A
SW19	ES-349474	SW TACT SKH4M004A
SW20	ES-349474	SW TACT SKH4M004A
SW21	ES-349474	SW TACT SKH4M004A
SW22	ES-349474	SW TACT SKH4M004A
TR1	ET-349592	TR 2SC3400 F05
TR2	ET-349592	TR 2SC3400 F05
TR3	ET-349592	TR 2SC3400 F05

PARTS LIST

6. OPERATION (B) P.C BOARD

Ref. No.	Part No.	Description
D1	ED-376335	D SCHOTTKY SB02-03 T05
D2	ED-376335	D SCHOTTKY SB02-03 T05
D3	ED-344280	D SILICON H GMA-01-FY2 F05
D4	ED-344280	D SILICON H GMA-01-FY2 F05
D5	ED-376335	D SCHOTTKY SB02-03 T05
D6	ED-376335	D SCHOTTKY SB02-03 T05
D7	ED-376335	D SCHOTTKY SB02-03 T05
D8	ED-376335	D SCHOTTKY SB02-03 T05
D9	ED-376335	D SCHOTTKY SB02-03 T05
D10	ED-376335	D SCHOTTKY SB02-03 T05
D11	ED-376335	D SCHOTTKY SB02-03 T05
D12	ED-376335	D SCHOTTKY SB02-03 T05
D13	ED-376335	D SCHOTTKY SB02-03 T05
D14	ED-376335	D SCHOTTKY SB02-03 T05
D15	ED-376335	D SCHOTTKY SB02-03 T05
D16	ED-376335	D SCHOTTKY SB02-03 T05
D17	ED-359863	D LED LN81CV-(LF) AK ORANGE
D18	ED-359863	D LED LN81CV-(LF) AK ORANGE
D19	ED-359863	D LED LN81CV-(LF) AK ORANGE
IC1	EL-346071	IC M521BL-21
IC2	EL-346071	IC M521BL-21
IC3	EL-346071	IC M521BL-21
IC4	EL-346071	IC M521BL-21
L1	EO-318365	COIL FIX 1 LAL04 102K
L2	EO-318365	COIL FIX 1 LAL04 102K
VR1	EV-387796J	VR ROTARY EVJ-2KA056B14 B103 [VIBRATE]
VR2	EV-356582	R S-FIX H RH0615C 0.10W 473
VR3	EV-356582	R S-FIX H RH0615C 0.10W 473
VR4	EV-356582	R S-FIX H RH0615C 0.10W 473
VR5	EV-365876	VR SLIDE VJ4513-2PVNB5 103 [VOLUME]
W101	EW-380936J	WIRE ASSY VX600 W101 26P

7. VR P.C BOARD

Ref. No.	Part No.	Description
VR1	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [BEND]
VR2	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [GLIDE]
VR3	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [BREATH]

8. OPERATION (D) P.C BOARD

Ref. No.	Part No.	Description
J1	EJ-380944J	SOCKET 75080950 34P
W109	EW-380947J	WIRE ASSY VX600 W109 34P

9. HEAD PHONE P.C BOARD

Ref. No.	Part No.	Description
J1	EJ-348846	PHONE J 3P HLJ0540-010 6.3

10. ENCORDER P.C BOARD

Ref. No.	Part No.	Description
VR1	ES-380946J	ROTARY ENCORDER EC16B25D

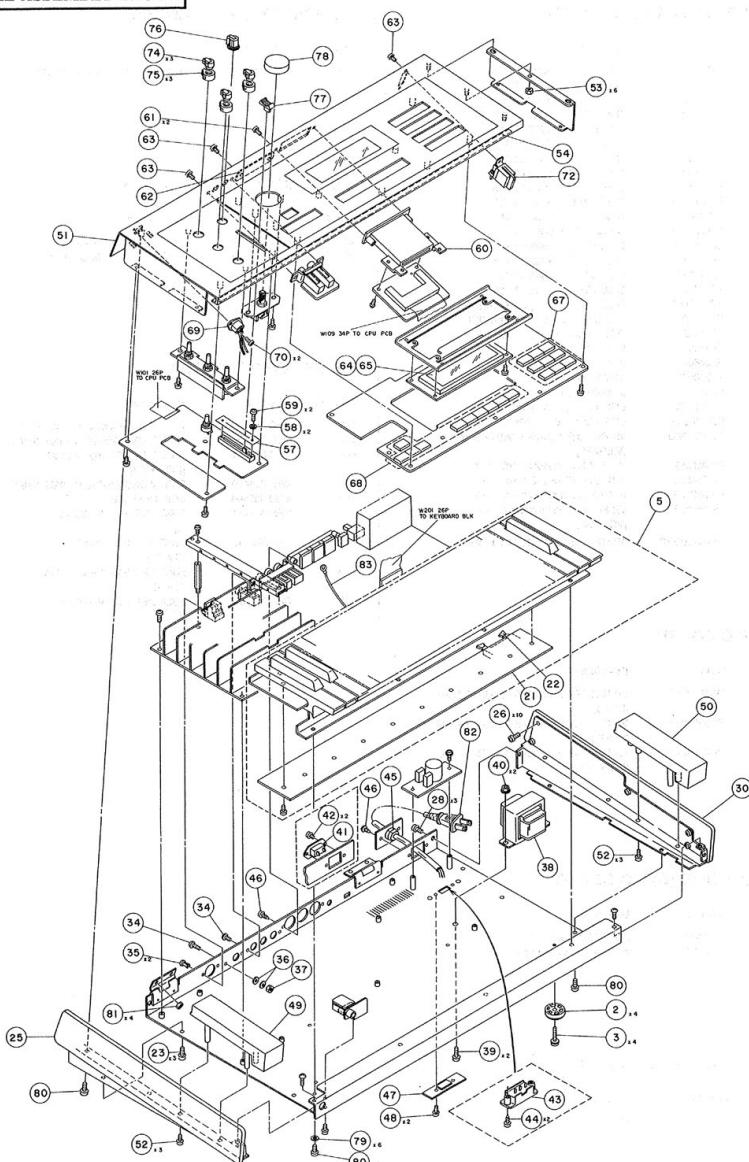
11. OPERATION (G) P.C BOARD

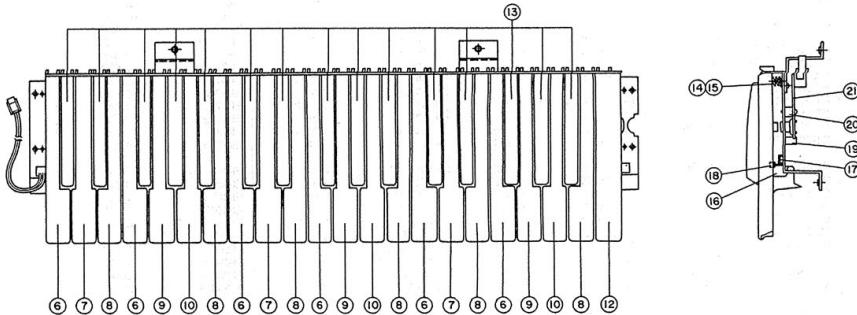
Ref. No.	Part No.	Description
J1	EJ-354105	PHONE J 2P HLJ0520-110 6.3
J2	EJ-354105	PHONE J 2P HLJ0520-110 6.3

12. FILTER P.C BOARD

Ref. No.	Part No.	Description
C2	*EC-358450	C CE V DNS102MBE B 102M 400AC
C3	*EC-358450	C CE V DNS102MBE B 102M 400AC
C4	*EC-338411	C CE V DE7 FZ 103P 400AC [EXCEPT J]
C5	*EC-358450	C CE V DNS102MBE B 102M 400AC
FL1	*EO-360068	COIL LF LP-2 B
F1	*EF-306124	FUSE TSC A 250V 630MA [J]
F1A	*EF-305703	FUSE TSC 125V 630MA [C,A,Y1]
F1B	*EF-695766	FUSE SEMKO T 250V 315MA [E,V,S]
F1C	*EF-355385	FUSE BET T 250V 315MA [B]

FINAL ASSEMBLY BLOCK





13. FINAL ASSEMBLY BLOCK

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
2	SA-332850	FOOT ROUND SHAPED	49	SP-384038J	PANEL SUB(L)
3	ZS-362533	ST PAN30X05STL CMT C080 [FOOT FIX]	50	SP-384039J	PANEL SUB(R)
5	BK-383936J	KEYBOARD BLACK ESK-832 37KEY	51	SP-383787J	PANEL FRONT PART
6	SK-726278J	KEY WHITE C K80	52	ZS-331532	PT B1D30X08STL BNI
7	SK-726279J	KEY WHITE D K80	53	ZW-413188	N40STL CMT 1
8	SK-726280J	KEY WHITE BE K80	54	SP-384036J	MASK KEYBOARD
9	SK-726281J	KEY WHITE G K80	57	SE-362389A-A	MASK VOLUME(A)
10	SK-726282J	KEY WHITE A K80	58	ZW-321317	PW21X040X050PSL
12	SK-726277J	KEY WHITE CC K80	59	ZS-362266	PAN20X02STL BNI
13	SK-726283J	KEY BLACK 5 K80	60	SE-383777J	ESCUOTHEON IC CARD
14	ZG-728369J	SP KEY BLACK K70B/N27	61	ZS-383937J	PT PAN30X08STL NI3
15	ZG-728370J	SP KEY WHITE K70B/N6	62	SC-388713J	COVER CONNECTOR
16	MZ-728371J	DAMPER K90DP79	63	ZS-593908	PAN30X06STL NI3
17	MZ-728372J	DAMPER K90DP27	64	EM-382317J	IND LCD EDMIG245633B
18	MB-727159J	K10 GUD GUM A	65	EL-728382J	EDMIG245633B EL BACK LIGHT
19	MZ-728374J	ANGLE K30A/G136	67	SK-38388J	KNOB PUSH
20	ZW-728375J	SPEAKER K30SS135	68	SK-384037J	[DATA KNTRY] [SOFT/CURSOR KEY] [NOB PUSH(B)]
21	BA-728376J	PC K60P9166	69	EJ-375424	PLUG EMC-TM
22	EJ-365891	PLUG RA-H261T-D-0190 26P	70	ZS-355818	ST B1R26X04STL CMT
23	ZS-388071J	ST B1D40X05STL BNI	72	ES-364478	SW SEESAW SDDTA1 T8.01-1 [SW POWER]
25	SP-383776J	COVER(L)	74	SK-383789J	KNOB DOUBLE(UPPER) PART [BEND/GLIDE/BREATH]
26	ZS-417137	ST B1D0X04STL CMT	75	SK-383781J	KNOB DOUBLE(LOWER)
28	ZS-341960	ST B1D40X06STL BNI	76	SK-383790J	KNOB SINGLE PART [VIBRATE]
30	SP-383786J	COVER SIDE(R)	77	SK-383390J	KNOB SLIDE [VOLUME]
34	ZS-355511	ST B1D0X06STL BNI	78	SK-382429J	KNOB UPPER PART [CONTROL]
35	ZW-698308	RV NYL X30X055 BL	79	ZW-273914	SW40
36	ZW-273802	TW30	80	ZS-537074	B1D40X06STL BNI [KEYBOARD FIX]
37	ZW-516993	N90STL CMT 1	81	ZW-516993	N30STL CMT 1
38	*BT-383926J	TRANS POW L1023 J [J]	82	*EW-365947	AC CORD 250 SKP210KS17B A [J]
38A	*BT-383927J	TRANS POW L1023 C,A [C,A,Y1]	82A	*EW-357931	AC CORD 3 CORES VM0033A SJT18A [C,Y1]
38B	*BT-383928J	TRANS POW L1023 E,V,B,S [E,V,B,S]	82B	*EW-366055	AC CORD 250 KP11WSJT18 UC [A]
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40	ZW-413267	N FRANGE 40STL CMT	82D	*EW-358631	AC CORD 2C KS-17 LTBS2F BS [B]
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44	ZS-350934	PT B1R30X08STL BNI			
45	EZ-302306	STRAIN RELIEF SR-6N-4 [C,A,Y,]			
46	ZS-447761	T2BFR30X06STL BNI			
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ABBREVIATIONS FOR THE SERVICE MANUAL

ABBREVIATION	EXPLANATION	ABBREVIATION	EXPLANATION
ADC	Analogue to Digital Converter	MIDI	Musical Instrument Digital
AMP (Amp)	AMPlifier	MINI	Interface
BBD	Backet Brigade Diode	MIX	MINImum
BCD	Binary Code Decimal	MOD	MIXer
B.DOWN	Brak DOWN	M.WHEEL	MODulation
B.UP	Back UP	OSC	Modulation WHEEL
CE	Chip Enable	RAM	OSCillator
CH	CHannel	RD	Random Access Memory
COMP	COMPArator	REG	ReaD
CONT	CONTrol	RESO	REGulator
CV	Control Voltage	RL	RESOnance
DAC	Digital to Analogue Converter	ROM	ReLay
EG	Envelope Generator	S/H	Read Only Memory
EXT	EXternal	SW	Sample and Hold
FREQ	FREQency	THRU	SWitch
HPF	High Pass Filter	TRANS	THRoUgh
INH	INHibit	U	TRANSpose
INT	INTerrupt	VA	Upper
INV	INVerter	VCA	Voltage Analog
L	Lower	VCF	Voltage Controlled Amplifier
LFO	Low Frequency Oscillator	VR	Voltage Controlled Filter
MAX	MAXimum	VREF	Variable Resistor
MEMO	MEMORY	WR	REference Voltage
			WRite

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